

WATER WORKS

FOR

FREDERICTON.

ADDRESSED

TO THE OWNERS OF REAL ESTATE,

BY

G. E. FENETY.

FREDERICTON—OCTOBER—1881.

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To the Owners of Real Estate.

In writing this Pamphlet it is not with the belief that the information and suggestions which it may contain, will be productive of any practical result, or bring about "Water Works," in the immediate future; although it is a subject which for years has agitated, from time to time, the public mind, and led to earnest discussions at the City Council, ending, however, in defeat on every occasion. The main object in writing this is for the purpose of explaining many matters that seem to be dimly understood by a considerable number of our Citizens—to remove erroneous impressions in regard to the subject of taxation, which it is conceived would follow, in an oppressive form, the expenditures necessary to the introduction of a sufficient water supply—to meet the point raised by many persons, on every occasion when this question is opened up anew, to the effect that the work of introducing a water supply and carrying on the works should be in the hands of a Company, and not undertaken by the City, which point in my opinion is the most erroneous because the most objectionable of all—the reasons for which will be shown in future pages—in a word, my desire is to place this subject before the public in all its aspects in such way, it is hoped, as will render it sufficiently intelligible to the most ordinary comprehension. If then

we are not to obtain what is so essential to the health, happiness and prosperity of Fredericton (an abundant supply of pure water) at a cost so trifling in comparison to the benefits to be secured, it may not, it is to be hoped, be said hereafter, as it is frequently said now, "water works are all very well, but where is the water and the money to come from, and how are we to pay the additional taxation to be entailed?" In a recent lecture Henry Ward Beecher remarked—"I think a man should look upon the welfare of the community where he dwells, upon its health, and upon its enterprise and prosperity, with a large, generous, liberal spirit. A man ought to abhor living in a city unventilated, undrained, unwatered, unswept, unlighted, uncared for. It is the business of every citizen to see to it that the place where he lives is made tenantable and beautiful; for, as it is said, 'Man shall not live by bread alone.' It is not enough to feed a man's mouth, give him as much as he can eat and drink. His ear ought to be fed with music, and his eye with beauty. And he should see to it that the whole of the community has that which shall make it high and beautiful."

I propose to consider the subject of Water Works under the following heads:

1. Proceedings of the City Council.
2. Sanitary requirements and Board of Health.
3. Facts.
4. Fire and domestic purposes.
5. Large Fires in Fredericton.
6. City or Company undertaking the Works.
7. Sources of Water Supply.
8. Probable cost and taxation.
9. Mode of Assessment.
10. Insurances.
11. Concluding Remarks.

HISTORY OF CITY COUNCIL PROCEEDINGS.

On 2nd February, 1875, a Communication was read at the Council Board, from the Board of Trade relative to Water Works, urging their necessity on numerous grounds. A Committee was appointed to confer with the Board of Trade to consider the subject and report. The result of the whole

proceedings was a Resolution passed that as Water Works were desirable and loudly called for by the Citizens, a vote should be taken by the ratepayers, "yea" or "nay," and upon the majority would depend the final issue. The above is merely the substance, which is all that is requisite, the Resolutions and Amendments were numerous and lengthy, and the debates were adjourned from day to day, occupying several sittings. One Resolution, however, might be here copied from "Minutes of Council," dated February 10, 1875:

"6. The vote shall be by ballot—those in favour of introducing of Water Works by the City Corporation putting 'yea' on their ballots, and those opposed to it, 'nay'; but no ballot shall be rejected if it can be gathered from its face in which way the voter requires to vote; all double ballots shall be destroyed and shall not be counted."

The subject here rested until the 17th February, when at a meeting of the Council the following proceedings took place, which are given here nearly in full, on account of their importance and the apparent earnestness manifested unanimously by the Council in favour of Water Works:—

"Moved, seconded, and adopted without a division—

"Whereas it is inexpedient to take a popular vote of the Citizens upon the subject of Water Supply until investigation be had as to the most advisable method of providing and the probable expense thereof; therefore

"Resolved, That a sum not exceeding five hundred dollars be appropriated for the purpose of employing a competent Engineer to investigate the different modes of Water Supply, and the probable cost of each; and further

"Resolved, That the Order for Ward voting, by ballot, upon the question of the introduction of Water into the City, passed on the eleventh day of February instant, be rescinded; and further

"Resolved, That a Committee be appointed to prepare a Bill, to be submitted to the Legislature at its present Session, permitting the City to introduce a proper system of Sewerage and Water Supply. Such Bill to contain a clause restricting its operation until the Citizens shall have approved the same by a popular vote; and that such Committee do report to this Council as soon as practicable."

A Committee to prepare a Bill was thereupon appointed.

On the 10th March Alderman ——— “presents a Bill which he has prepared, entitled A Bill to provide for the establishment of a system of Sewerage and Water Supply for the City of Fredericton.”

“On motion—A Bill to provide for the establishment of a system of Sewerage and Water Supply for the City of Fredericton,—as submitted by Alderman ———, is read, considered, and adopted section by section, * * * without division.”

A Committee was accordingly appointed to prepare a Bill in accordance with the draft above submitted, without altering the principles, have the same engrossed and submitted to the Legislature “*with the smallest possible delay.*” This clearly indicates that the Council were in earnest!

It was then “Resolved that a Petition be presented to both Branches of the Legislature, under the seal of this City, praying that A Bill to provide for the establishment of a system of Sewerage and Water Supply for the City of Fredericton may pass and become law.”

April 1. On motion, it was ordered that a cheque do issue for the sum of \$25, to remunerate the Alderman for drafting the said Bill.

Now all this certainly meant business, or costs would not have been incurred—first, for drawing a Bill, and afterwards as will presently appear voting \$500 for obtaining a survey and report. Perhaps we never came nearer having Water Works than on this occasion. The Bill which became law still stands upon the Statute Book of 1875, passed April 10,—it occupies twelve printed pages. The following is also taken from the Minutes:—

“On the 1st June 1875, at a meeting of the City Council, it was Resolved—That a Civil Engineer be appointed to make the necessary survey under the Act passed at the last Session of the Legislature for the establishment of a system of Sewerage and Water Supply for this City; such survey to be an exploratory survey, and his Report to contain the probable cost of erecting the works for the different localities explored and the probable running expenses yearly, and the expense of such survey not to exceed the sum of \$500 appropriated therefor by this Council, and report the same to this Council.”

Accordingly H. G. C. Ketchum, Esq., was appointed for the purpose, 7 to 1.

On the 15th December 1875, Mr. Ketchum made his Report, when it was Resolved by the Board that the Report be accepted and copies be printed in Pamphlet form for circulation—[this blank was subsequently filled with 500]—also received Mr. Ketchum's account for \$500 (ordered to be paid).

On the 4th April, 1876, the consideration of Mr. Ketchum's Report was again brought forward, when it was Resolved (in obedience to the terms of the Act of 1875) that a vote of the Citizens (viz: "yea" or "nay") be taken on the 2nd day of June next.

On the eve of the vote being submitted to the people, the Council met, *specially*, on the 12th June, and on motion—"Resolved—That while this Council comply with the terms of the Act of Assembly relating to Water Works in ordering a popular vote thereon, it cannot recommend the Act to the Citizens for their adoption by affirmative vote for the following reasons:—

"1st. The Act places the appointment and control of the Commissioners in the Executive Government of the Province and not in the Citizens:

"2nd. In the event of an affirmative vote the control of the work and time for proceeding is placed beyond the control of the Citizens:

"3rd. The Act is in the opinion of the Council so far defective in its details as to make it dangerous to put in operation:

"4th. In the present financial position of the Corporation, it would not in the opinion of the Council be wise at once to press the Act into operation, or pass a vote which would warrant the immediate appointment of Government Commissioners to proceed with the work." Carried 5 to 3.

On motion, and adopted—"Ordered that the City Clerk do cause the above Resolution to be immediately printed and posted throughout the City for general information."—Carried.

I do not think that the whole history of legislation can furnish a parallel to this. Some months before, as has already been shown, the Council had a Bill prepared, and

discussed section by section, carried it unanimously, appointed a Committee to lobby it through both branches of the Legislature, paid \$25 for the same, provided \$500 for a survey,—all done calmly, deliberately, without excitement, and upon the most approved business principles. Now, just upon the eve of the day when the vote is to be taken—"yea" or "nay"—the Council meet, a thunder bolt is launched, intended to take effect next morning, when the polls in the different Wards are being opened, and the protégé of a few months before is to be annihilated by a device, second only to the celebrated *coup d'état* of Louis Napoleon in 1851 (?) when he sought to destroy the Republic, by imprisoning the night before the leading Generals of the French Army, such as Cavaignac, Changarnier, Lemorecier, and thus striking terror into the Army and the hearts of the people of Paris. By this bold stroke he succeeded. Whether so designed or not, the effect of this dark strategic movement by our Council was all that the worst enemy of Water Works could have desired.

As might have been expected the vote was lost. One half of the voters staid at home in consideration no doubt of this vacillation. The "nays" numbered 296—the "yeas" 70. Majority against Water Works 226. Thus came to naught all the proceedings of the previous year, which cost so much time and money, and left the subject of Water Works to be commenced—*de novo*.

On the 2nd August, 1876, a communication was read at the Board from John Richards, Esquire, and another from Mr. Marshall, Saint John, the latter as Insurance Agent, calling upon the City Council to make better provision for fire protection, as the interests of all the Companies which he represented, as well as the interests of property owners, required that something more should be done, otherwise rates of insurance would have to be increased. Mr. Richards' communication was in the shape of an offer, on behalf of the Waterous Engine Company, to erect buildings and bring water into the City, from Queen Street back to Brunswick Street, for \$55,000, and to run the same for three years for \$3,200 per year, 17 hours per day. Also to place Hydrants, for fire purposes, in various parts of the City, &c. &c. Referred to a Special Committee to report upon. Nothing

came out of this movement. Taken up, laid on the table—taken up again—laid on the table again, where—it still lies.

On the 16th November, 1877, another spasmodic effort was made, viz:—"Whereas it is the opinion of this Board that a system of Water Works, operated by steam power, or some other equally good system, is indispensably necessary for fire, protective, sanitary and mechanical purposes; therefore

"Resolved unanimously, That a Committee be appointed to take the subject into consideration, and communicate with parties conversant with the erection and management of such works, and the probable cost, with a view to the introduction of Water Works into the City." A Committee was accordingly appointed. The result—*nil*.

On the 3rd February, 1880, a communication was read at the Council Board, from H. G. C. Ketchum, Esq., proposing on the part of a Gentleman in the United States to furnish Fredericton with a suitable Water Supply—to be taken from the hills by gravitation—he to furnish the money, materials, labour. The following is from the letter itself:—

"These works to include all machinery, reservoirs, dams and connexions; finding and laying of all water pipes in all the streets and roads of the City, being not less than six miles for distribution purposes alone exclusive of main water pipes; also the providing of all fire hydrants, and the protecting of them free from frost, and keeping them in order and repair ready for use at all times.

"He guarantees that the head or pressure of water shall be sufficient to throw or force a number of streams simultaneously over any house in the City; and that the quality and quantity of water shall be equal to that supplied to any City of the United States.

"The conditions are, that the City will grant unto him, or a Company he may form, the exclusive right to construct and own Water Works, and to lay and maintain water pipes and hydrants, for a term of thirty years.

"That the City shall have the right to purchase the works, rights and franchises at any time after ten years, for a sum equal to that upon which the net receipts and profits of the Water Works would pay interest at the rate of six per cent. per annum.

"That the property shall be exempt from taxation, also the income thereof, for the above named term of 30 years.

"That the City shall contract to pay an annual rental for the use and maintenance of a number of hydrants (said number to be hereafter agreed upon) for the purpose of extinguishing fires, watering the streets, and flushing the sewers when required; said rental not to exceed the sum of five thousand dollars per annum.

"Mr. Norman reserves to himself the right of selection of the source of supply, and will contract with owners and occupiers of dwelling houses, hotels, boarding houses, manufactories, stables, offices, stores, steam engines, &c., according to a scale of charges to be published beforehand."

The Contractor further stipulates to commence operations early in the Spring, and have the works completed in the course of the Summer.

After various discussions the Proposition was finally *tabled*, where it still remains.

This, then, is a brief history of Water Works' proceedings at our Council Board from time to time, which furnish evidence that the City through its representatives has been somewhat alive to the importance and necessity of a proper water supply, although as yet unable to grapple with the question in a practical business like way. This admission is an important element in the way of progress, and encourages the hope that something may yet be done, if the way is made plain, towards which this Pamphlet is an attempt.

WATER FOR SANATORY PURPOSES.

No town or city, according to the testimony of medical men and scientists, is safe from pestilence, fevers, and diseases of various forms whose sources of water supply are shallow, or surface wells. On the contrary, the reverse is the case and the grave yards in the neighbourhoods are the unerring witnesses. Mr. Gilbert Murdoch, the Chief Engineer of the Water Works, St. John, N. B., was recently invited by the people of Charlottetown, P. E. Island, to make a survey of their neighbourhood, for the purpose of obtaining a suitable water supply. The low level of Fredericton is very similar to the topographical formation

of Charlottetown. The result of Mr. Murdoch's investigations is contained in a very able Report which he addressed to the Mayor and Aldermen; and from this I shall have occasion to draw information in elucidation of a point or two as we proceed. It may be here mentioned that Charlottetown is fairly aroused, and will ere long be in possession of a public work so much needed.

A communication was addressed to all the medical men of the town, for the purpose of ascertaining their opinions with regard to the use of water from surface drainage, or shallow wells, the source upon which the people have to depend; and with remarkable unanimity, all heard from, pronounce severe judgment upon the present supply. One gentleman says:—

“Most of the wells of the City, from their peculiar location, receive the surface drainage, and with it a large amount of decayed and decaying animal and vegetable matter, which is decidedly deleterious to the health of the community and no doubt very much assists in the development of fever in its various types.”

Another says—“The appropriation of wells as sinks and privies is very wrong and should not be tolerated. I know of one such well in this City, which was the means of poisoning another well distant about 60 yards therefrom.”

Another—“Reducing the subject to a fine point, it is an utter impossibility to ward off these epidemic attacks of fevers without a thorough system of drainage and water; and it would be well for the public to attend to these matters at once; if they do, they will find the rate of mortality greatly lessened.

“For the last few years I have remarked that Ward 5 is liable to be attacked by an epidemic fever of the low typhoid type, with cases of dysentery; the usual results of tainted water, ending in many instances fatally.”

Another—“Do you think the prevailing diseases such as scarlet, typhoid or other fevers which visit us annually have any connection with the use of our well water, or with defective drainage?

“There can, I think, be no doubt that as long as the people continue to use water from our public wells, just so

long will they suffer to a great degree from various diseases which might be traced to its use."

Another—"Typhoid fever, which prevails during the autumn and early part of winter, is caused in numberless instances from the surface drainage of the city, and the use of the water of the city wells."

The above will suffice to show the evils attendant upon the use of impure water. Enough to fill a volume, which lies before me, could be adduced in support of these statements. But the limits of this book will not permit further outside references. We therefore come to the published opinions of our own medical men, and also to facts outside of them, in connection with the mortality of our City, which will exhibit a rather melancholy state of our sanitary condition.

In the *Fredericton Reporter*, dated January 20, 1875, a letter appears over the signature "G. E. Coulthard, M. D.," from which an extract is here made:

"Though the disease which has so alarmingly prevailed in our city during the last four or five months has well nigh exhausted itself for this season at least, reference to it at this time may not seem inappropriate, inasmuch as it has come to be a regular autumnal visitor, and there is no reason to suppose that the autumn of '75 will be an exceptional one. Each year it has made its appearance to a greater or less extent, and we think that the majority of observing persons must admit that its severity is annually on the increase. Such a state of affairs has excited just alarm among all classes, and we are loth to believe, as some have it, that a wonderful apathy in reference to attempts at its subdual exists. The fact is that so many dozens of causes have been advanced both by the medical fraternity and the laity at large, that the masses of the people are put to their wits' ends in attempting to solve the cause of fever in their households. One householder gravely informs another that he has been fully expecting fever to break out in the latter's house, on account of his villainously bad well water."

The writer then goes on to state what he conceives to be the principal causes of the trouble, viz: bad water, bad sewerage, and filthy premises—most parts of the City reeking with foul odors and miasmatic breeders. He calls upon

the Board of Health to discharge their duties with more alacrity, and to have the accumulations of filth for years removed.

[It may be here remarked that when this letter was written the present Board of Health was not in existence. It was not organised until the following Spring, the first meeting having been held Saturday evening, 8th May, 1875. Since that time forward the City has been thoroughly looked after by the Inspector; twice a year and sometimes oftener he visits every yard and every spot where he suspects impurities, and compels their removal wherever found; and it may be safely said that Fredericton this day is as clean a City as it is possible to make it without sewers and pure water, and yet fevers and diphtheria destroy a large per centage of our population. If disease has been mitigated to some extent by this cleansing process, the fire is still smouldering and "pestilence walks abroad at noon-day," through the nauseous agency of surface drainage, called well water, which after all seems to be the main source of our troubles. It is true that when Dr. Coulthard wrote his letter we had a Board of Health in theory, but like all old things it had worn out—had outlived its usefulness. It was an institution of immemorial origin—regarded more for its formality than its familiarity with its requirements. No one seemed to feel responsible for the bad sanitary condition of the City. Hence the new organization, under new legislation provided by the Government, and now in most successful operation. Its meetings are held very often in the course of a year.]

Another extract is here made from Dr. Coulthard's letter; it may be as well to state, however, that since the year when this letter was written, the old sinks and cess-pools have been cleaned out—at the rate of about two hundred every winter, and the work is still prosecuted with the utmost vigour. No animal is allowed to be killed in the City between the months of May and November. Formerly Fredericton was the great slaughter house at all seasons.

"The next subject (Dr. C. says) is that long harped-over and awfully familiar one, our water supply. Descending from the heights in the rear of the city it makes its way through the sandy soil and reappears in numerous places along our river bank. Below a certain depth it is not to be found, as then we

come upon a bed of clay, and upon this fact hangs a tale which we believe is intimately connected with the Typhoid story. Since the earliest settlement of the town, the vaults in our out-houses have been sunk in the soil in most cases till the stratum of water was reached. In another part of the premises a well has been dug. We may safely affirm that in the great majority of instances the state above alluded to prevails in most of the lots in our city. Many of these out-houses have remained in *statuo quo* as far as the contents were concerned, for many many years, and numerous others could plead entire ignorance of any cleansing effort on their owner's part, since their first formation. What should we look to as this result? A soil overtaxed and no longer able to remove the sewage from the tainted water as it goes onward toward the river."

The Reporter of 27th January, 1875, contains another letter—from (the late) Dr. Gregory—from which the following extract is made: it is sufficiently explanatory and needs no comments:—

"There can be no doubt in the mind of any physician at all acquainted with the hygienic condition of Fredericton, that the chief cause of the great amount of sickness with which we have recently been afflicted is our very imperfect sanatory arrangements, and more particularly the bad quality of the water used for drinking and culinary purposes. I can well recollect hearing the late Dr. Toldervy, one of the highest scientific authorities we have ever had in our midst, express his opinion of the extremely deleterious nature of the water of Fredericton, and every year that I have been in practise has only caused me more and more strongly to endorse that opinion. Situate on a low-lying flat, with a light sandy soil, and with well, water closet and sink in close apposition in nearly every yard, with no natural drainage except downwards, it is manifest that the water of our wells cannot fail to be contaminated with the products of animal and vegetable decomposition—a fact which sometimes becomes only too evident to the senses of both taste and smell. Now it is generally admitted by physicians that by far the most frequent cause of Typhoid Fever is the drinking of water containing the products of animal decomposition, or in other words, of water impregnated with the soluble con-

tents of privies, manure piles, slaughter houses, &c. If this is so, is it any wonder that fevers should abound among us. I believe I am within bounds when I say that there were four cases of Typhoid Fever in Fredericton in 1874 for every one in 1857, and I can see no reason why that disease and others of a similar nature, Dyphtheria, Scarlet Fever, Measles, &c., should not continue steadily to increase, unless we bestir ourselves and do what is in our power to remedy the evil.

"There has been at times an outcry against the Board of Health for not doing its duty in pointing out nuisances, and taking proper steps to have them removed. But what can be expected of a Board of Health organised as ours is, without a dollar at its command, or liberty to expend one without special permission of the Provincial Government. It is neither fair nor right to expect the Province to pay for what we ought to do ourselves. If we will not take care of our own health, we have no right to call on the Government to do it for us. Let us have a Board of Health and Health Officers, paid by the city, and endowed with proper authority, and let a sufficient sum be assessed annually to defray the necessary expenses. By that means some considerable portion of our insanatory nuisances might be remedied.

"The chief great requisite however is an abundant supply of good water, and fortunately for us, that is not difficult to be obtained. It is merely a question of dollars and cents, and after our past experience in the way of sickness, and the severe lesson given last night by fire, the fear of a few dollars increased taxation should not be allowed to interfere with doing what nearly every one now acknowledges to be necessary. The work moreover should, in my opinion, be undertaken by the City Corporation. No private Company would do it unless it expected it to be a source of profit, and if there is any profit let the city be the gainer. There would then be no Company to come in collision with; the supply would not be liable to be cut off because of unwillingness to pay exorbitant rates, as in the case of the Gas Company, and there would be no ring or power to exert an influence for selfish ends at elections either civic or county.

"The question of water supply is the most momentous local question that has ever come up amongst us, and is worthy of most careful and serious consideration. It will

involve the expenditure of many thousands of dollars, and will entail a burden on our children and grand-children, for which it behoves us to see that they get a fair equivalent. Let us not in a penny wise, pound foolish policy adopt any plan which, while it may perchance suffice for our present needs, cannot at a moderate additional outlay be so increased as to meet any probable demands that may in future be made on it."

As before remarked, the Board of Health has for years been doing its utmost to purify and keep the City clean. Beyond this, however large its powers, it cannot safely go—it may protest, expostulate, advise; but until the people themselves enter into the spirit of the work and wishes which the Board have at heart, there can be no substantial improvement in our sanatory condition.

Perhaps no member of the Board of Health has manifested more earnestness in favour of Water Works than Dr. Atherton, whose opinions appear to coincide with the almost unanimously expressed opinions of medical men the world over, to the effect that health and cleanliness must go hand in hand—that wherever there is bad water, bad sewerage, bad ventilation—pestilence, fevers, diptheria, and such like, must abound, especially among children. Dr. Atherton's experience, like that of all the Medical gentlemen of Fredericton, is sufficient to justify the belief that if the facts in regard to diseases which daily come beneath his observation, were more generally known and regarded by the people, we should not be without a pure Water supply, no matter what the cost, for a longer period than it would be possible to obtain it.

On the 9th February, 1880, the Board of Health passed the following Resolutions:—

"Whereas from time to time the subject of the sanatory condition of Fredericton has been brought before the Board of Health, and in connection therewith the importance of pure Water, the want of which, in the opinion of our Medical men, is to be largely attributed to the frequent occurrence of typhoid fever and diptheria, the present source of supply being wells into which filter much of the refuse matter of untidy premises and offensive material, thereby rendering the water impure and noxious: In order to meet the difficul-

ties of the case, a pure source of Water supply is required, and cannot be introduced a day too soon ; therefore

" Resolved, that it is the opinion of this Board, that as a proposition for providing this City with an ample supply of pure water has been submitted to the City Council, this Board feel it to be their duty to recommend that the City Council give the said proposition their careful and serious consideration.

" And on motion of Dr. Harrison, it is further

" Resolved, that Judge Steadman and Dr. Atherton be a Committee to wait upon his Worship the Mayor, or any Committee of the City Council that may be appointed, for the purpose of explaining more fully the views of this Board on the subject."

JAS. S. BEEK, Clerk.

The Committee afterwards met a Committee from the City Council, but—after consultation, it all ended in—*nothing*.

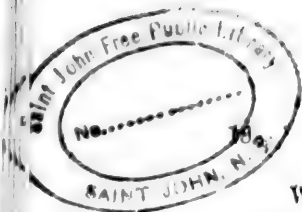
RATE OF MORTALITY.

In 1878 the number of deaths from diptheria alone in Fredericton, amounted to 53. The number of cases may be set down at 300.

The death rate for three years ending August 1, 1880, was 335—including children from diptheria and fevers 87.

The above statements are furnished by the Board of Health Inspector. During some years diptheria and fevers are more prevalent than in others. A dry hot summer is said to be a fomenter of these disorders. The germs of disease, however, are latent in our midst, and ready to break out under circumstances favourable to their development and zymotic influences. However much, therefore, families may feel that they enjoy an immunity from these attacks, because no plague so far has invaded their dwellings, and taken their little ones, it must be remembered that all the conditions of disease surround them, and although favoured and blessed so far, the grim enemy is lurking about and only awaiting a favourable opportunity (a foul wind, wet feet, or organic derangement,) to despoil them of their household treasures. Once get the living stream—a pure water supply, and—may it be added?—

" Thou shalt not be afraid for any terror by night, nor for the arrow that flieth by day ; for the pestilence that walketh in darkness, nor for the sickness that destroyeth in the noon-day. There shall no evil happen unto thee ; neither shall any plague come nigh thy dwelling."



FREDERICTON WATER WORKS.

WATER FOR FIRE AND DOMESTIC PURPOSES.

This branch of the subject is of far greater importance than that of any other, if we except the sanatory considerations. Perhaps no City of its size has suffered more from fire than Fredericton. I am indebted to the kindness of Mr. Richards for the following compilation made by him a few years since:—

" LOSSES BY FIRE IN THE CITY OF FREDERICTON.

Year	Loss	Insurance
1850	\$406,700	\$49,500
1851	1,100	100
1852	500	—
1853	1,000	400
1854	165,000	47,500
1855	2,000	1,000
1856	6,500	2,000
1857	5,000	3,600
1858	18,200	11,800
1859	17,200	9,500
1860	35,400	20,000
1861	67,600	23,300
1862	19,300	6,400
1863	4,200	2,000
1864	3,200	700
1865	15,600	7,200
1866	16,250	5,800
1867	47,560	24,000
1868	24,200	14,300
1869	12,150	4,800
1870	33,100	13,900
1871	52,200	26,200
1872	22,000	12,000
1873	21,900	6,900
1874	18,400	8,800
1875	53,480	24,900
1876 to May 1,	24,900	13,770
\$1,094,640		\$340,470

Thus it will be seen that since the year 1850, Fredericton sustained losses by fire to the extent of ONE MILLION, NINETY FOUR THOUSAND, SIX HUNDRED AND FORTY DOLLARS, or an average of over FORTY THOUSAND DOLLARS per annum. The insurance paid during the same period was THREE HUNDRED AND FORTY THOUSAND, FOUR HUNDRED AND SEVENTY DOLLARS, leaving a total loss to our citizens of seven hundred and fifty five thousand one hundred and seventy dollars.

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During the last four years our fires have not been so heavy, but our escapes from destruction like that of St. John in 1877, have on several occasions been most remarkable. We may therefore feel a certain amount of indifference on this account to our absolute necessities and duties; but we are resting upon the hill-side of a volcano, in fancied security, until the crater is in eruption, when escape will be at the cost of great and unpardonable sacrifices. The occasions to which I refer are—first, when Mr. Dibblee's house at the upper end of Queen Street, now "Risteen's Factory," was destroyed. It was in the summer, and there was a gale of wind blowing at the time equal to that which swept destruction over half of St. John; but fortunately the wind blew across the river. Had it come from the west, it was apprehended at the time, the greater part of the City would have been laid in ashes. The next was the destruction of the Exhibition Building in 1877. The wind was fair for sweeping the City. Fire-flakes fell on houses below the Cathedral—all parts of the City were in danger. Almost every house top was manned, and buckets of water were used persistently. Our escape, however, on that occasion, was due to the fact that the houses and barns were covered with moisture, the effect of a recent heavy rain. The last occasion was when a large Factory Building was destroyed in May, 1881, on George Street. It was a terribly gusty day, but the wind did not favor the course of the embers from the fire; although most people feared at one time a terrible catastrophe. The Catholic Church caught several times. Certainly if it had not been for the great services rendered by the steam engines, no ordinary fire engines would have been equal to the occasion. The fire tanks on that day were taxed to their utmost capacity. Had they given out (and such a thing is possible) the fire must have gone on until every thing in the way of wood within its reach would have been devoured.

With regard to our main dependence for water in cases of fire, it may be remarked that the cost of the Tanks built from time to time, would have gone some distance towards paying for Water Works, while the inadequacy of the present arrangement is self-evident. However we had to do the best we could under the circumstances. These Tanks are situated as follows:—

Carleton Street Extension, near River.
Corner George and Saint John Streets.
Charlotte Street, near Exhibition Building.
Corner King and Northumberland Streets.
Opposite City Hall.
King Street, between Regent and Carleton.

Altogether they cost nearly \$3,000; and yet more are required under the present system.

No objection is here raised against the work done, or the cost; for these Tanks have been absolute necessities, and have more than paid for themselves by the property saved through their agency. But it is nevertheless a fact, that however useful they have been in the past and likely to be in the future, they are far from being equal to a large conflagration—nor do they stand high enough in the confidence of Insurance Companies to warrant them in lowering their premiums on risks. Some of these Tanks can be pumped dry in an hour—while the best of them, as I learn from good authority, may be exhausted in three or four hours steady pumping by one “Steamer.” The whole town then, involving nearly a million of property, is dependent upon such “safe guards” as these in case of a large fire and a strong wind. Of course there is the river besides—but in order to turn the current into the city, and render this great supply effective, other things must be in unison—strong pumping power contiguous to the fire, and stout and lengthy hose have got to be considered as well.

A gentleman, connected with Insurance Offices, and well qualified to judge, informs me that upwards of \$30,000 are annually sent out of this City to pay for Insurances effected. But call the amount \$20,000, as we have no accurate data, and it may be asked is not this a tremendous and increasing drain upon our pockets—and yet we believe in this indirect mode of voluntary taxation, with scarcely a murmur—and why? Because we cannot help ourselves, or rather, it may be said, can help ourselves but do not. The reader will please keep this insurance idea in view for re-examination in future pages.

For fire protection alone, every citizen, having property insured or not, should hold up his hands in favour of Water Works. It has been frequently asked, how is it that Saint

John was half swept away in 1877, notwithstanding all her water supply? The answer is plain and may be simply stated, viz: with an inexhaustible supply, Saint John is and always has been without a sufficient head at its source, to throw water for fire purposes without the aid of engines—in the higher parts of the City, the water level scarcely reaches the second story of a dwelling house. So that when the fire, simultaneously as it were, broke out in various parts of the City—from flying embers carried by a terrific gale, and the engines could not be at all points at once, the Water Works were of very little use. Had there been a hundred, or even fifty feet head, the fire could have been met and fought at all points, and that great calamity averted. The same may be said of the great Quebec fires. As far as information can be obtained, and I have spared no exertions, there has been no town, or city, where water works have been introduced, with a suitable head, that has suffered a serious loss from fire; whereas, before their introduction the people in some cases have lost terribly in this way. Indeed, Cities so privileged all but boast of their immunity, and laugh at the prospect of being seriously injured from fire, much less destroyed.

Thus, then, we must have a head of water (from whatever source—whether from the river by pumping, or from the hills by gravitation) sufficiently high to be independent of fire engines altogether—otherwise my advocacy of water works would be far from being so earnest. But this is as practicable as any thing can be, judging by the light we at present have in local published Reports of Civil Engineers. Basing our calculations upon this theory, I would place a Hydrant on *one* of the four corners of each block in the City, fifty being the number; and according to the estimate made these Hydrants would be in such proximity, that a coil of Hose 400 feet long placed on one of the Hydrants would extend nearly mid way between one Hydrant and another—so that in case of a fire breaking out in the middle of a block, it could be reached by a Hose attached to a Hydrant at either corner. An illustration of this may be given thus: Suppose a fire broke out in the centre of Queen Street, and there was a Hydrant at the corner of Carleton Street and another at the corner of York Street (Davis' Drug Store), a Hose could be attached at either Hydrant, or two on both, and the fire

would be under command. Thus, every street and every block would be similarly protected—and the stream or streams of water would rise far over the highest building in the City, and no engines would be required. To say nothing of every house owner being provided with Hose upon his own premises for immediate use, at a moment's notice, should a fire break out in his dwelling.

The proof of these averments are here submitted from documentary evidence in my possession.

Moncton.—It is about three years since Water Works were introduced into Moncton, N. B.—population 4,000. The water is obtained by gravitation—the source of supply is three and a quarter miles distant from the point of distribution. There are 17 hydrants so far, for fire purposes, three of which, when opened at one time, are capable of throwing from a one inch nozzle water to an elevation of seventy feet. (I saw, when in Moncton in August, the experiment tried). Engines are of no use, or considered by the inhabitants as things belonging to the past. The rates of insurance have been reduced one half—while many persons do not insure at all. Judge Botsford informed me, that however much some persons, who dreaded the probable taxation, are now among the loudest, in saying that they would not be without the water supply “for the world,” it is regarded not only as a protection from fire, but as a “universal blessing.” The people are taking the water into their houses as fast as they can get it, and consider the charge as nothing compared with the comforts.

Truro, N. S.—These works have been in existence about six years. They are what is called “The Holly System.” The water is pumped from a river near by. There is also combined a small flow of water from the hills, which is merely used to save pumping, and keep the pipes full for domestic purposes. In 1877, when in Truro, I saw six hydrants opened at one time, which sent up streams to an elevation of 100 feet. No fire engines are required. Up to this time there are about three miles of pipe laid in the streets. The people generally take the water, and do not object to the charges, which they more than save on insurance, which has been reduced 1 per cent. There are up to this time 20 fire hydrants. My informant (a gentleman

of first standing in Truro) says, "The whole cost of the works up to the present time, independent of annual expenses and interest, is under \$30,000." Average cost of running the works for the last 5 years \$769.33. The population is about 4,000.

Bangor.—Four years ago, a number of gentlemen belonging to Fredericton made up a railway party and visited Bangor for the purpose of inspecting the system of Water Works in that City, which is the "Holly system," by pumping. The water is taken from the river about two miles up, where it is dammed, and furnishes a supply to keep the pipes full and for ordinary domestic purposes. Some eight or ten fire hydrants were opened at one time for the inspection of our people—ample pressure was applied, and the water was thrown to a computed altitude of 100 feet. The company were fully convinced from this exhibition that no fire could possibly have existed for any time within the radius of these hydrants, which covered perhaps a mile of ground. On asking the Mayor of Bangor (who kindly invited the company to his house to meet the Councillors of that City and members of the Water Board) what he would do in case a fire should break out on the instant, he replied, "Keep perfectly cool and attach my fire hose to the plug, and drown the fire without alarming my neighbors." In this way is every property owner in Bangor protected—having hose ready on his premises for use at a moment's notice. Insurances have been reduced one half—while many persons who formerly paid 2 per cent. do not insure at all, but have risked themselves for the last eight years. There has been no large fire in Bangor (say eight or ten houses at a time) since the works have been established; and the people feel perfectly safe on retiring to rest at night.

New York obtains her water supply by gravitation from the Croton River, *forty* miles distant. There are two reservoirs in the City, one in the Central Park and another about two miles below—kept in reserve mostly in case of accident. The head of water is insufficient to avoid the cost of fire maintenance—steam engines have therefore to be kept up.

Boston obtains her water supply from the Cochituate River by gravitation. Fire engines have also to be used

here, as the head of water is inadequate to admit of a fire being extinguished without their use.

Philadelphia obtains her supply from the Schuylkill, at Fairmont Park, by pumping into a reservoir near by, situated on a high hill. Immense overshot water wheels are going day and night, the water being dammed up in the river a little above, which furnishes the power for pumping. The head of water is not high enough to avoid the use of engines on the town flat, Philadelphia proper being situated about six miles from the reservoir.

Halifax.—No large fire occurs in Halifax at the present time. When there a few weeks since I was informed that no engines are required in the lower parts of the City. The water by gravitation is thrown over the highest buildings. Towards the top of "the hill" engines are required. The fire department, however, is conducted at a comparatively small expense. The insurances have been reduced.

Ottawa.—As there is no method of obtaining water by gravitation, the Holly system is in use, the water being pumped from the river. From a very excellent Report of Thos. C. Keefer, C. E., in reference to Water Supply for Ottawa, the following extract is made,—it is in reference to fire protection:—

"For the speedy extinction of fires, nothing can equal the high pressure hydrants, from which, as soon as a hose can be attached, a ceaseless stream is poured on the flames, confining them to the place of origin. This system not only extinguishes the fire in the shortest possible time, but it has been found greatly to reduce the number of fires, and has been the means of detecting incendiarism. The fire is extinguished before the proofs of intended incendiarism are destroyed, and the prepared and saturated combustibles are thus revealed."

Mr. Keefer goes on to say—

"In a commercial view the value of a soft water supply like that of Ottawa is very great. It makes all parts of the City, where the pipes extend, equally available for many classes of manufactures, and from this cause, as well as the superiority of the quality over well water, for steam engines and some branches of business, it leads to the introduction of manufactures which would otherwise go elsewhere. More-

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over, an efficient water supply would not be without its influence in determining the residence of many persons of leisure and means.

"A most important consideration which leads to the selection of a particular town for every kind of establishment, is the question of Insurance. If it be established that large stocks of provisions, manufactures, etc., may be held here as safe from the ravages of fire as elsewhere, and at the lowest rates of Insurance, Ottawa will continue to be the depot of the Ottawa Valley, and of the supplies for its great Lumber Trade for all future time."

It has never been a subject of consideration with most persons that the difference between the use of well water and soft water amounts to a tax upon a family of five persons of about six dollars a year, viz: in the wear and tear from washing clothes, in fuel, in cooking, in the extra quantity of soap used, and in the larger quantity of tea alone required in hard water.

Mr. J. F. Bateman, the Engineer of the Loch Katrine Water Works, Glasgow, in his Report says—

"From calculations made by very careful housekeepers, they calculated that the *saving* by the use of Loch Katrine water, to say nothing of the wear and tear of clothes in washing, was quite equal to the rate which they paid for water, and on the north side of the river it was then £36,000 stg. a year; so that the saving to the city of Glasgow *** amounted to *two shillings per head per annum* *** I may mention (Mr. Bateman continues to say) that in my own house in the country I introduced about three years ago very soft water, equal to Loch Katrine water, in place of hard water, which I had before, and the *saving* amounts to about *four to five shillings per head* on the household soap used in my establishment for house purposes and washing."

Mr. Braidwood, when Superintendent of the London Fire Brigade, stated before the Society of Arts, as follows:—

"From 1838 to 1843, £776,762 were lost in Liverpool by fire, almost entirely in warehouse risks. The consequence was that the Mercantile rates of Insurance gradually rose from about 8 per cent. to 30, 40, and it is said in some cases to 45 per cent.

"In Liverpool, Manchester, and other cities, the extinction of fires by the pressure of water only, without the use of fire engines, is very much practised. The advantages of this system are very great.

"The supply of water is the most vital part of any exertions towards extinguishing fires. Where the pressure is sufficient, and the mains large enough, by far the most economical mode of using the water is to attach the hose directly to the mains.

"On an impartial consideration of the facts, he was confident that practical concurrences would eventually be given to the conclusion at which he had arrived, that the principle of all future arrangements for the repression of fires, must be a constant supply of water kept at high pressure, night as well as day, and the direct application of it from the mains before the door, by means of a hose and jet. By that arrangement he had proved that a power equivalent to three or four of the best engines might be kept constantly before each door ready for application within two minutes."

Thus it is seen that hard water is not only destructive to clothing and expensive in food preparation, but it is very hard upon machinery, boilers particularly, by the incrustations formed, causing the walls of the boiler to burn out and become dangerous.

We hear it said over and over again that Fredericton requires Factories in order to her business development. All very well as far as words go; but it is customary before attempting to take a ride for a person to have a horse not altogether lame, as well as a carriage, or his progress will be rather tedious. In making brick you require straw, and you cannot have sticking mortar without hair. True, you can work a factory without a system of Water Works—by a bucket arrangement, or a local reservoir plan; and so can you work without steam power—by mere hand labour. But, what does the mechanical intelligence of the nineteenth century say to all this?

When in Moncton I visited the new Sugar Refinery, where upwards of sixty men are employed. They have a local supply of water which can be used by pumping; but the supply from the Water Works is the all in all to the successful

working of the establishment in the way of water. There is never less than \$30,000 worth of stock on hand—raw as well as refined sugars, &c.—and without Water Works, the rates of Insurance, to say nothing of the cost of the immense buildings, would be far too great to enable the Company to carry on their works profitably, if at all. A great many hundred dollars are thus saved in this way, while for factory purposes, such as steam power, &c., the water from the works is indispensable. The City Council (Halifax) on the 14th August agreed to extend water to the site of the Cotton Factory at an expense of \$9,000 per mile! and in case the Factory is located near the existing main pipes to give a bonus of \$9,000 a mile towards the building of the branch track from the Intercolonial Railway.

These facts tend to show the vast importance of Water Works as precedent to the establishment of Factories in a town. Steam power and fire protection must be had. Without an abundant supply of water to furnish these, it is idle to talk about Factories in Fredericton. Go at once to the fountain head, and other things will soon follow. True we have large Tanneries, without Water Works—but does the reader know that when these come to pay 3 and 4 per cent. fire insurance, their profits are abridged to that amount—and further, what kind of property is more frequently destroyed by fire than Tanneries?

From the best information that can be gathered, Fredericton pays upwards of \$1,000 a year for water hauled from the River. It may be more—it may be less. One person of my acquaintance, in the lower part of the City, having a small family, states that he pays \$60 a year, and yet resides but a short distance from the river. The Hotels alone must pay large amounts. Indeed it may be fairly presumed that there is enough money paid out in this way, annually, to meet one fourth the interest on the outlay for Water Works, which would cover every street and alley in the City. This point I will endeavour to make more intelligible as we proceed. The business people on Queen Street last summer subscribed \$180 simply for a Watering Cart to lay the dust in front of their stores.

Another question is frequently asked—how can we have Water Works without sewerage to carry off the waste? However desirable that the one should go with the other, it is by no means an absolute necessity. St. John was as badly off for sewers in 1855 (when the works passed out of the hands of a Company into those of the City) as Fredericton is to day. Since then new sewers have been built and old ones repaired and enlarged, according to a regular system. We have in Fredericton outlets enough for the present to carry off the waste water. The soil (being exceedingly porous) furnishes natural sewerage. Notwithstanding the torrents of rain that have fallen this summer, the water disappeared as fast as it came down. A few hours' sunshine leaves the streets perfectly dry. Mr. Murdoch says: "Sewerage is not a necessity, and very rarely accompanies a system of water supply. Still it is a very valuable and desirable thing for a City to have. Of the two, however, the water is the more important." Carleton, St. John, has had Water Works for many years; and yet there are no special drainage facilities for house or surface water. Let us once obtain a water supply; and get our sewers gradually, as we can afford, making one or two streets a year, extending the operations over a series of years—the work to be paid for out of the surplus derived from Water Works, after paying interest and other incidental expenses.

PROBABLE COST AND TAXATION.

I have before me several Reports on Water Supply, authorised by the City Council from time to time, and paid for, viz:—

Mr. Charles Gregory's Report, made in 1867.

Mr. H. G. C. Ketchum's Report, made in 1876.

Also a Report on the Waterous system, furnished by Mr. John Richards, written by C. H. Waterous & Co., of Brantford, Ontario, containing a special reference to Fredericton.

I also have the Report of a Delegation who proceeded to Ontario in 1871, on behalf of our City Council, to inspect Water Works, signed "John Richards, Alexander Mitchell, and John Pickard," (the latter gentleman represented the Board of Trade). This Report is exhaustive, and advocates

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as strongly as language can do it, the necessity of Water Works, after what they had seen in their travels.

In alluding to these several Reports I offer no opinions, or preferences for one system of water supply over another. These are matters of detail, to be disposed of by competent Engineers, should we ever arrive at this stage on our journey. I might remark, however, that I am in favor of any system that will give us water works, whether by "pumping" or "gravitation." It is a mistake in my judgment for any one to express a decided opinion about a matter that science and competent persons only are capable of deciding. I refer to the above Reports merely to show the estimates made by each Engineer as to the cost and sources of supply respectively proposed, and with a view of arriving at an average amount upon which to base our calculations of probable cost and interest.

Mr. Gregory's Report embraces 21 pages, including Dr. Bailey's chemical analysis of the respective waters submitted to him for testing. Mr. Gregory's explorations are chiefly confined to Tower Lake and Garden's Creek. The Lake is situated at a distance of four miles and something over to the supposed points of distribution in the City, and its elevation over the level of the City is 360 feet. The water, however, is somewhat doubtful as to quantity, while the quality, though not the best in the world, is equal to that of some other Cities on this Continent, and considered not to be unhealthy. A very favorable line for laying the conduits into the City is marked upon the plan connected with the Report. From the head of the water named, Mr. Gregory proposes to throw streams for fire purposes over the highest buildings in the City. To remove all doubt as to the quantity of water, Mr. G. "turned his attention to Garden's Creek, the west branch of which is a spring brook; and as its course is through land free from swamps, *its water is of excellent quality*, and has not the amber cast which is so prevalent in streams in the neighborhood of Fredericton. The volume of water is large, it being the chief feeder to Garden's mill; and even in the drought of summer is greatly in excess of the possible requirements of the city for many years to come."

By cutting a channel and connecting Tower Lake, an auxiliary supply can be had for a population of at least 30,000.

The following are Mr. Gregory's figures as to cost :—

*Estimate of Cost of Water Supply to the City of Fredericton
from Tower Lake.*

2½ miles of terra cotta 9 inch pipe, 80 cts. per yard, ...	\$4,048
2½ " " cast iron 8 " " 212 tons, \$30, ...	6,360
Laying 5 miles of pipes, at \$400 per mile, ...	2,000
Cost of filter, ...	700
City distribution as below, ...	14,500
Engineering, superintendence, and unforeseen expenses, ...	1,820
Total, ...	<u>\$29,428</u>

*Estimate of Cost of Water Supply to the City of Fredericton
from Garden's Creek.*

2½ miles of terra cotta 9 inch pipe, at 80 cts. per yard, ...	\$3,520
1 mile and 32 chains of 8 inch iron pipe, 140 tons, \$30, ...	4,200
Laying 3 miles and 72 chains of pipe at \$400 per mile, ...	1,560
Cost of filter, ...	700
" dam, ...	500
Purchase of right, ...	1,200
City distribution as below, ...	14,500
Engineering, superintendence, and unforeseen expenses, ...	1,820
Total, ...	<u>\$28,000</u>

These estimates, however, may not hold good at the present day—in a dozen years the markets for iron and materials generally must fluctuate considerably. Again Mr. Gregory has not provided largely enough for the wants of the City. The miles of pipe mentioned are not sufficient, and in other respects. At best then, we can only approach this subject approximately.

In recommending the system of supply from Garden's Creek, (Mr. G. remarks) "I would beg to state that its efficiency and economy are unquestionable; and indeed, in this respect, few Cities are more favorably situated than Fredericton."

Mr. Ketchum's Report made in 1876, also exhibits a vast amount of scientific research and ability in his treatment of the subject. A new source of water supply is suggested—some distance below Tower Lake and Garden's Creek—viz: **MILL CREEK.** Mr. Ketchum says, "I have now to direct your attention to a source of supply, which on account of its

proximity to the city, and other advantages, merits your careful and attentive consideration. Mill Creek (sometimes known as Simonds' Creek), takes its source from springs and gathering grounds situated between Maryland and Hanwell Roads. It crosses the extension of Brick Kiln Road beyond Kirlin's, about two miles, and the Maryland Road about $2\frac{1}{2}$ miles, from the City. Several branches unite hereabouts, and it then continues a southeasterly course through the College lots and finally falls into the River Saint John below Fredericton. This stream possesses the merit of being constant; in the memory of those through whose property it runs, it has never been known to fail."

Mr. K. furnishes data to show the inexhaustible supply of this watershed or catchment, furnished by individuals living in the neighborhood, and from statistics of other places where areas of land supply cities like New York, Boston, and elsewhere, not a bit more favorably situated as to climatic dependence and physical condition than Fredericton is.

This watershed (Mr. K. observes) "will measure upwards of two square miles. The product of this area alone would give 2,000,000 gallons per diem, exclusive of the water derived from springs. There can be no doubt whatever of the sufficiency of the supply of this stream; but in order to provide for deficiency during drought of summer, an ample reservoir to hold from 20 to 40 million gallons is recommended to be constructed at the point of the stream whence the supply would be taken."

The Report goes on to say—"At the bridge near Smith's, the elevation of the stream above Fredericton was ascertained to be two hundred feet; here there is a good site for a dam. The foundation is ledge rock, the width of the valley narrow, and at a comparatively small expenditure, a masonry dam could be erected to store ten or twelve acres of water, twelve feet deep. From this point the pipes may be laid direct to the city, with an intervening reservoir, to take the extra pressure off the pipes, and to provide for emergencies in case of fire. * * * *"

The following is Mr. Ketchum's estimate of cost at that time (1876.) In giving these statements, as before remarked, it is solely with a view of showing the opinions of different Engineers, and that even the highest figures are within the

range of practicability in the carrying out. They are matters of detail, however, which can only be determined at the right time, by competent persons, when responsibility is to be assumed and the case presented in a business-like form.

Estimate of Mill Creek Supply.

2½ miles 12 inch mains, ...	\$25,000
Reservoir at 200 feet elevation, ...	4,000
Reservoir at 140 " "	6,000
Sub-mains and City distribution, ...	45,000
Total cost Mill Creek supply, ...	<u>\$80,000</u>

Mr. Ketchum says—"sufficient head can be obtained to overcome fire on the highest building, by merely attaching the hose to a hydrant. The excavation for the laying of the pipes is a trifling matter compared with that of St. John and Carleton."

In concluding his Report, Mr. Ketchum says—"The experience of all cities where it exists proves that it [the water] would lessen the liability to destruction by fire; and consequently the amount and rates of insurance. By promoting cleanly habits among the people, and abolishing the use of the present polluted water as a beverage, it would lessen the liability to disease, and thus induce new settlers to join the community. It would create new industries which the want of a proper supply for steam and other purposes now prevents. It would also make the place more attractive as a place of residence; it would increase the number of ratepayers, and augment the value of real estate. Wherever it has been established, it has become indispensable both as a luxury and a necessity to all classes of citizens alike."

The Waterous System, like that of "the Holly," is by pumping from the river, by means of stationary engines placed at a given point. The engines are required to be kept in motion continually, if the water is to be used for domestic purposes. In Bangor they are operated by hydraulic pressure, the water being dammed to a sufficient height to enable the engines to be run without fuel, but in case of fire a full head of steam is put on, and the stationary pumps a mile off are as efficient in conducting a stream, or a dozen streams, upon a burning building, as a fire engine if planted

directly beneath. Public sentiment in Fredericton, however, is divided between the two plans, viz:—"gravitation" and "pumping." But as before remarked, we have nothing to do with the process. So long as we can get the water, and by the most economical and best means, let us have it. We must not be distracted by side issues like this. Wherever either system is in operation the people of that town or city are satisfied that *their's* is the best in the world. The cost of pipes and the laying, and the hydrants, it is presumed, is the same whatever the system. As before remarked, when the Waterous proposition was made to the City Council for supplying Fredericton, the price named was \$55,000; but since then (1871) prices for materials and labour may have materially changed.

PROBABLE COST—WHETHER THE CITY OR A COMPANY
SHOULD UNDERTAKE THE WORK.

The opinion of persons capable of judging is that we ought to obtain all the Water Works required for a sum not exceeding \$80,000—at all events that would be a safe figure upon which to base our calculations, the interest on which at 5 per cent. (it is presumed that as the money market is now easy, there is no better time for borrowing) would be \$4,000 per annum. How to meet this will be considered hereafter. But in the mean time let us devote a few moments to the arguments advanced by some persons, to the effect that *a Company should undertake the work*. If we are not to have water unless in this way, I believe it will be a fatal mistake to surrender the rights and interests of our City for such a purpose. This idea has always evinced to my mind a disposition in opposition to Water Works on the part of persons who thus talk. It may be for want of proper information as to the practical working of such things in places of ordinary size wherever tried, St. John for instance. Take an abstract view of the proposition, and it may be asked—if a revenue is to be derived from such works, why give a Company a monopoly of them, and be subject to their control? What is for the public good should be a public undertaking. If there is any risk or loss in the business, why should private individuals suffer? It is because there is to be no loss but large gains that I wish the public to be the sole owners and

managers of the works. Let us now briefly review the history of Water Works in St. John, under Company management and City management. The works were started in St. John about the year 1833, by a Company. Legislation was obtained, and the cost of construction duly estimated. As the work progressed the Company found itself hampered for want of means, and pipes in consequence were laid through a few streets only. The revenue was barely sufficient to maintain the works (there could be no property rate) and dividends were out of the question. The consumption proved to be greatly more than was anticipated, and the supply in consequence was changed from a constant to an intermittent one of two hours daily—from 6 o'clock until 8, A. M. The water was shut off the entire City at the last named hour; and when a fire broke out it was allowed to burn until the alarm reached the "turn-cock," when the water was let on and the mains filled. After a time the public began to get their eyes open, and thought that after all there was something worse than *taxation*—viz: total destruction from fire; and so in 1849-50, the Company, with a view to a constant supply and to get rid of the inconvenience and cost of pumping, made an extra push, raised more money, and built a dam, and laid a 12 inch to a reservoir at Little River. [In fairness it should here be mentioned that the pumping process at that day was altogether different to the Holly and Waterous systems of the present day.] There was great rejoicing in St. John over this advance movement; but three years had barely passed before it was discovered that to maintain an efficient head at the summit and meet the *waste* belonging to the constant supply system everywhere, a greatly larger main was required. The Company was again without money. Its means were exhausted. Extension of the work was suspended, and the supply confined to the few streets through which distributing pipes had been laid.

In 1854 the cholera broke out; and in Saint John as in other places its favourite feeding grounds were the *unsupplied* sections of the City—such as the "Back Shore," Saint Patrick's Street, York Point, and Portland. The higher elevations were the last to be attacked, and these, from the fœtid and pestilential atmosphere by which they were surrounded. Through this sad experience people got their

eyes still wider open, and began to comprehend more fully than ever the danger of the situation. A Government Inspection of the whole system of Water Works was instituted, which finally resulted in the purchase of the Works from the Company by the City. This was considered the only way of obtaining all the water necessary for the health and comfort of the people. It was deemed impossible for any Company to grapple with the difficulty, unless the Company risked all its means, and then with doubtful results. Although the Company afterwards obtained legislation for levying taxes, or property rates, it was found almost impossible to collect them. It was met by opposition and prejudice on all sides. It was charged with being a money-making institution, that people were taxed for the benefit of private individuals, &c. &c. [It may be remarked here that a Company will do its utmost on the side of economy for the benefit of its own interests—to make all it can out of its opportunities. Therefore inferior pipes, bad workmanship, shallow and unsafe trenches may be provided and buried up—the iron liable to fracture, the openings to overflow and damage the streets—especially if the works are to be handed over to the City after a certain number of years, as a provision in the contract. By that time the works will probably have gone so far to decay that a general renewal would have to follow. These things happened to a large extent in St. John. The pipes laid by the Company were too small for then existing needs, while others were far from being in a satisfactory state.] As soon as the works changed hands confidence was established. When the people became the owners, all were alike equally concerned and all hostility ceased, because the people had nobody to quarrel with but themselves. So much, then, as an example for other places to be governed by. We may talk as we like about obtaining legislation that will fit in and meet all interests—those of a private Corporation or a public Corporation. Public sympathy must be in harmony with public law, or there must be a failure in the execution.

The works in Saint John are now managed by three Commissioners, acting independently of the City Council. They levy and collect the water rates, carry on the works, and make all disbursements. The water debentures (6 per cent.) command a premium of ten and eleven per cent. Indeed

this has always been considered the best public stock in Saint John, because the people have confidence in the works, the management, and the revenues obtained.

In 1857, so great became the demand for water that an additional 24-inch main pipe or conduit had to be laid along side of the old 12-inch main; and in 1873 a second 24-inch main was laid. Every street in Saint John is now supplied, as well as the more densely settled parts of Portland; and fifty times more water flows in than there did prior to 1855. As soon as the works fell into the hands of the Corporation debentures were issued at 6 per cent., redeemable in 40 years. The interest is provided from a property rate. The consumption rate is another source of revenue, but not obligatory on any one to pay, unless he wishes the water. There is therefore no compulsory tax, except the property rate, which is so trifling that nobody considers it, unless on the favourable side—in the fact that if a man pays \$2 on \$1000 he gets back \$10 on insurance. The consumption rate amounts to \$5 on a family of 5; but this is a *voluntary* tax altogether, and can be saved. In Fredericton (with far less expensive works) the rate would probably be \$3 per family.

Let the people of Fredericton then never surrender into the hands of a private Corporation the power of creating water works; but consider such an undertaking as a great boon, from which large revenues are to be derived, and great blessings obtained.

The following is a reply to a letter which I addressed to a gentleman in Saint John, well informed upon the subject he discusses. I was desirous of obtaining a disinterested expression of his opinion upon the matters at issue—it is therefore written without bias. He says:—

“MY DEAR SIR,—I have a strong opinion in favour of the water supply of a City being owned and managed by a City; and this opinion is held by all who have given unbiassed thought on the subject in Europe and America. The spirit as well as the wants of the age are opposed to the granting of monopolies to private companies to traffic in water—a chief essential of wealth and comfort and safety—and the City that does so commits a great mistake. The interests of the public and those of a Company are to a large extent antagonistic; often directly opposite to each other. The public re-

quire copious supplies of water for sanitary and protective purposes as well as for manufacturing and household uses, at the lowest possible cost; while the Company, with a view to profits and dividends, desire and exact a relatively big price for a small supply to its ordinary tenants or customers, and extra pay for fire and sanitary supplies.

"A Company-Water-Supply is an antiquated idea, and is never seriously thought of when a City understands the full extent of its wants and has sufficient public spirit to provide for the same. The history of Saint John and Halifax: of Montreal and Toronto: of Boston and New York: of Glasgow and Edinburgh: and of Manchester and Liverpool, (Eng.), is the history of almost every other City whose first water supply was in the hands of a private Corporation. Small pipes—inferior water—penurious supply—imperfect protection—sanitary neglect, and heavy rates. Years of suffering and discontent; ending at last with the buying out of the rights of the monopolists, and the reconstruction of the works at a heavy cost to the tax-payers."

I may add here that the Water Works in New Haven, (U. S.) belong to a Company. The citizens are desirous of obtaining the same by purchase, according to an Act of the Legislature which gives them the option. A Report has just been published—a copy of which I hold—drawn up by a Committee of the City Council appointed to consider the question of purchase. The Chairman addressed the heads of all the Cities in the United States having Water Works, in order to get their opinions, as to which is the best method; and out of 114 Cities, only 34 are in the hands of Companies, while the answers from each City, of leading influential persons, with singular unanimity, *are opposed to Company ownership and management.*

COST OF THE UNDERTAKING—INTEREST—TAXATION.

We now come to the most important considerations of all, viz: the cost—the "the ways and means," and that most lively of all subjects—*taxation!* It does not come within the vision of those who discern nothing but mischief to their pockets, that by means of judicious expenditures, large profits are resultant—if not directly in money, certainly in health, happiness and general prosperity. A late Political Econo-

mist remarks—"there ought to be a public sentiment that whatever is best for the health of the city or town,—whatever is best for the convenience of all the citizens, and especially what is best for the poor, for the young, for those that cannot help themselves in the community, the whole community should do, and that every man should contribute his share."

Now I wish to show that Water Works may be obtained in Fredericton at a cost, as already intimated, that will not involve a single dollar of taxation. This may seem like a monstrous proposition, but it is capable of proof. With regard to the "poor man," (a colloquial expression—too often designedly used for political purposes), I would except him from the scale of charges and assess real estate altogether—although it would be somewhat difficult to discriminate between what is really a poor man and a rich man, from the fact that there are owners of property *more poor* than those who only own the clothes they stand in. I would place the burden (?) upon the shoulders of real estate owners, because they are to be chiefly benefited by the fire-protection they will receive, the advance in their property, their means of recouping themselves by reduction on their Insurances. The "poor man," instead of being oppressed will find new and continuous employment in trenching, pipe laying, and all other ways incidental to public works—not only for a year, but year after year—in fact for all time, for this work must lead to the commencement of many industries, as in other places. Moncton is alive with workmen engaged upon its streets, and in its factories, while new enterprises are contemplated—whereas before the introduction of Water Works there was comparative stagnation, unless in the vicinity of, and belonging to, the Railway Works. Real estate owners will please direct their attention to the facts below, as an alleviation of their responsibilities, should it be considered a mistake to ask *them* to undertake the work and pay the cost. With regard to tenant supply of water, that is a matter to be regulated between landlord and tenant.

As before remarked, we have strong presumptive evidence that water may be introduced and distributed in all parts of Fredericton for \$80,000, the interest on which at 5 per cent. would amount to \$4,000. The assessed value of Real Estate

in Fredericton for 1881 is \$1,537,905. Personal Property \$784,060. Income \$454,350. These amounts show the abilities of our people to assume a far larger obligation than what is proposed. But let us confine ourselves to Real Estate only. There are parts of the City that of course cannot for many years be reached for water purposes, any more than for gas purposes—such as in the neighbourhood of “Morrison’s Mills,” the back parts of King’s Ward, extending several miles into the country—also from Government House to the City boundary beyond. These sections are embraced in the Real Estate estimate, but the appraisements in the outlying parts are very small. Within the City proper there are 900 Dwelling Houses, besides Barns, Stables, and outhouses of various kinds. Suppose we deduct from the Real Estate enough to leave us \$1,200,000, upon which to assess as a property rate, and suppose this rate to amount to \$2 on the \$1,000—that is to say, as soon as the pipes are laid through a street and a Fire Hydrant is placed in the neighbourhood, the property in front of which the protection and supply are furnished will contribute \$2, according to the above scale. This amount would yield \$2,200 towards interest. The assessment for the Fire Department amounts to \$3,000—suppose we deduct from this \$2,000 and place it to the Water fund interest account; and the whole \$4,000 is provided. If water introduction is to be our great safety in time of fire, the \$2,000 may safely be transferred from one fund to the other. The estimate here made is not intended to be definite. It is only to show that our calculations are within the range of possibility as well as our means to deal with this work in a practical way. If the assessment should amount to \$2 on a \$1,000 property rate, (it may not be anything like so much) and we now pay 2 per cent. (which I think is the rate paid on Queen Street) which amounts to \$20 on the \$1,000, you may safely deduct from your insurance \$10, and thus make \$8 by the operation, and be able if you wish to take the water into your premises—*costing you nothing* as it were. In fact it is the saving to be made in the Insurances that is to pay the interest and finally the debt itself, plus the probable water rate. If we now send away \$25,000 a year, we may with Water Works save half that, (if not three quarters)—viz: \$12,500. Here then is a simple answer to the question—where is all the money to come from to carry on the work?

But, again, although debentures may be provided for \$80,000 they will only be floated when wanted—as the work progressed a debenture could be sold—and, as it will occupy several years to pipe the whole City, instead of being assessed \$4,000 a year, this full amount would not be required for three or four years, so that the interest to be provided for the first year would be comparatively small—and the \$2 tax would only fall on those who are put in possession of the water, and receive all the advantages. But, as above remarked, besides this property tax for yielding interest, we must take into account the revenues to be obtained from consumption supply. As fast as the pipes are laid people (as in other places) will demand the water. Those who were the most blatant, and did their utmost to oppose its introduction, would be among the first to praise and have it. They will forget or deny that they were ever in opposition. Is there an opponent of Responsible Government at the present day? The most bitter foes which the Reformers had to contend with in their agitation, afterwards became perfectly oblivious of their obstructive course—not only so, but not a few of the survivors inherited some of the finest offices in the gift of the Crown. Others sowed the seed amidst hardships while they reaped the harvest. So will it be with Water Works in Fredericton in a few years after they are in operation! But it may be remarked, as it has been recently, how do we know that the Insurance Offices will abate their charges? We do not require to know—because their action need not concern us. The trouble of the whole thing is that until you have Water Works you must submit to whatever rates are imposed—whereas with them, you are or may be independent of Insurance Companies altogether. Just after the Saint John Fire in 1877 the Offices combined and advanced our Fredericton rates considerably. (In remarking thus, it is not in the way of complaint—Insurance Offices, like others, have a right to guard what they conceive to be their interests.) And, we are still liable to a further increase. In other words, in self-defence we are willing to submit to taxation; and yet have a readier, better and cheaper way of avoiding this, nay gaining great blessings, if we could only concentrate our thoughts in the right direction.

In St. John and other large Cities, the scale of prices ob-

served includes charges for many things which need not apply here. For example, on animals of different kinds there are special rates, which rates could here be dispensed with, as it is very probable that revenue enough could be obtained from the simple family use of the water as well as the property rate. This must not then be held up as a bugbear to alarm the timid. But even if it were levied no person is obliged to take the water. Let this fact be always kept in view when the alarmist is about.

The numerous establishments outside of private families in Fredericton, many of which would insist upon having the water if introduced—and be glad to pay from \$20 to \$50 a year, may be here enumerated.

There are 10 Public Buildings ;

There are 12 Factories ;

Clothing establishments, 7 ;

Tanneries, 4 ;

Foundries and Mills, 4 ;

Hotels, 6 ;

Livery Stables, 4 ;

Boarding Houses, 15 ;

Public Halls, 7 ;

School Buildings, 6 ;

Printing Offices and Binderies, 6 ;

Banks, 2.

All these would swell the revenues very much. It would be an exception to the rule in all other places for these establishments to refuse to take the water, according to the scale of rates, whatever those rates may be.

BOARD OF COMMISSIONERS.

The works should be placed in charge of a Board of Commissioners ; three persons manage the whole business in St. John ; the Chairman only receives a salary. In Bangor there is what is called "the Water Board." In both Cities the utmost confidence is felt in the management. These respective Boards are free from political influence, and yet strictly amenable to either Corporation for any irregularity, or unjust or wasteful expenditure. The same governing body I presume would be created and recognized in Fredericton.

Of course salaries would have to be paid—but my idea is that if three sterling men could be found, in whom the public would have every confidence, willing to devote themselves to the work, the mere remuneration to which they would be entitled would be no compensation, and therefore probably not be accepted. But this question is neither here nor there. Whatever the expense of management it would only form a part of the whole scheme, and come under the head of current expenses.

CONCLUDING REMARKS.

There is no reason whatever why legislation should not be had next winter, and preparatory arrangements made for the introduction of Water Works into Fredericton next summer. As the necessity for a proper water supply must be obvious by this time to every one, talk should give way to action. The people have only got to show their sincerity and determination, and the work is half commenced. With regard to the City Council, it is idle to call upon the representatives of a divided community to act in this matter, or any other of importance to the general interests, unless the Council are backed up by public opinion, and “the well understood wishes of the people,” and then they will act as we want them to. No blame therefore can be attached to the present or previous Councils every time that Water Works have come up for consideration, with perhaps one exception. Their worships have been influenced by, or rather succumbed to, the prevailing indifference; they have heard people talk in favor of Water Works; but using “buts” and “if’s” enough to render a belief in their sincerity doubtful—others, stoutly in opposition on the ground of taxation—others, on the ground that as we have got along so far without Water Works we can continue to do so—others, fully in favor but inactive at the right time and in the right place in using their influence, and thus rendering efficient service in the cause. Let Ward meetings be held and every voter feel that he has a duty to discharge, to himself, his family, and his fellow citizens, and speak or vote at those meetings according to his convictions—in order that the candidates for each Ward may understand what is expected of them in case of being elected. We send men to the City Council year after year, as a mere

matter of form, or of favor, and never think of raising a *live issue* at the polls, on the side of public improvement, public progress; and, as in other places, ask pledges of candidates to carry out their promises in accordance with our wishes. The consequence is that Fredericton from one decade to another, draws her slow length along in the old ruts, and therefore is not much more prosperous to day than she was 40 years ago. It is doubtful if real estate commands a better price in 1881 than it did in 1840? Extraneous aid alone (in the railroads supplied) has given us what little vitality that is observable. Now a City so favorably situated, whose surroundings cannot be surpassed for natural beauty and physical features, ought to be in the van of agricultural and commercial communities. Had the Seat of Government been removed last winter, as threatened, there would have been a general collapse. We stood the shock of battle it is true, when the troops were taken away; but their removal was a small matter compared with what would have been the loss of the large expenditures made in Fredericton through legislation and the staff of officials belonging to the various departments. We should be independent of all such auxiliaries; our business *health* must be made subservient to creative and recreative objects. The first step to be taken to secure these and get out of this slough, is for the people or property holders to unite and say that *they must have public works*—water works to commence with. Let this be made an issue at the polls in January—and, if carried, the commencement of such works next summer will inaugurate the beginning of a new epoch—of business life and activity—of progress and prosperity. It is no more difficult to manage an undertaking of \$100,000 than one of \$5,000. Place your lines upon a sound foundation. Lay your plans with judgment at the beginning—let your estimates be correctly made, and under judicious control and direction, failure is next to impossible. But on the other hand, nothing will be done unless our business people and tradesmen bestir themselves. A mere expression of opinion, for or against a measure, is not sufficient. Nor is it enough merely to vote. You must work and advise as well. If business is meant and Water Works are intended, our young influential men, who are always to the front, and properly so, on public occasions, or

for sporting purposes, should throw themselves into this work with all the zeal for which they are famous, and victory will be sure to follow. I have no more interest in the introduction of pure water into Fredericton than any other citizen. So that whether you are for or against Water Works, you will please remember that this book is written and published solely with the object of trying to render what I conceive to be an important service to the best interests of Fredericton.

G. E. FENETY.

Fredericton, October, 1881.

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